SEMFWE327

Developing and marking out templates for metalwork

Overview

This standard identifies the competencies you need for developing and marking out templates prior to cutting and/or shaping the material in accordance with approved procedures. You will be required to select the appropriate materials and equipment to use based on the information presented to you and the accuracy required to be achieved. The templates produced may be used for marking out, setting of fabrications or pipe arrangements or preparing (setting) heavy plate for rolling.

Your responsibilities will require you to comply with organisational policy and procedures for the marking out and template making activities, seeking out relevant information and reporting any problems with the equipment, materials or template making activities that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You will be expected to work with minimum supervision, taking personal responsibility for your own actions and the quality and accuracy of the work that you produce.

Your underpinning knowledge will provide a good understanding of your work, and provide an informed approach to template making. You will understand the marking out and template making process and its application, and will know about the equipment, materials and processes to be carried out in sufficient depth to provide a sound basis for carrying out the activities, correcting faults and producing the templates to the required specification. You will understand the safety precautions required when carrying out the template making activities and when using the associated tools and equipment. You will be required to demonstrate safe working practices throughout, and will understand the responsibility you owe to yourself and others in the workplace.

Performance criteria

You must be able to:

1. work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
2. obtain and use the correct information for marking out
3. obtain the appropriate marking out equipment and check that it is in a usable condition
4. prepare suitable datums and marking out surfaces
5. develop templates that comply with quality and accuracy standards
6. mark out using appropriate methods
7. check that the marking out complies with the specification
8. deal promptly and effectively with problems within your control and report those that cannot be resolved

Knowledge and understanding

You need to know and understand:

1. the specific safety precautions to be taken when working in a fabrication environment with sheet or plate materials (general workshop and site safety, appropriate personal protective equipment (PPE), accident procedure; statutory regulations, risk assessment procedures and COSHH regulations)
2. the personal protective clothing and equipment that needs to be worn when carrying out the fabrication activities (such as leather gloves, eye/ear protection, safety helmets)
3. the correct methods of moving or lifting sheet or plate materials
4. the hazards associated with fabrication work and how they can be minimised (such as handling sheet/fabricated components; using dangerous or badly maintained tools and equipment)
5. how to obtain the necessary drawings, template specifications and job instructions
6. how to use and extract information from engineering drawings and related specifications (to include symbols and conventions to appropriate British, European or relevant International standards in relation to work undertaken)
7. how to interpret first and third angle drawings, imperial and metric systems of measurement, workpiece reference points and system of tolerancing
8. principles and techniques for marking out templates
9. geometrical methods for developing of complex shapes (such as square to round, lobsterback sections) from sheet metal
10. how to produce a three dimensional shape from the two dimensional material
11. use of marking out conventions (such as datum edges/lines, centre lines)
12. the preparations that need to be carried out on the material prior to marking out to enhance clarity and accuracy, and safety
13. the component material characteristics and process considerations that need to be taken into account when marking out templates
14. allowances for joint and weld preparations for different materials and thicknesses
15. how to calculate true lengths, bend allowances and circumferences
16. the effective use and care of tools/instruments
17. how to mark out and preserve the template for maximum clarity, accuracy and ease of transfer

18. ways of laying out the shapes/patterns to maximise the use of plate or sheet material
19. setting and adjusting tools, such as squares and protractors
20. how to transfer information to the underside of the sheet or plate
21. the importance of using tools only for the purpose intended; the care that is required when using the equipment and tools; the proper way of preserving and storing tools and equipment between operations
22. the need for clear and dimensional accuracy in marking out to specifications/drawings
23. the problems that can occur in marking out templates and how these can be avoided
24. the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve

Scope/range related to performance criteria

1.

Mark out plate or pipe setting for **two** of the following:

- 1.1 angular setting
- 1.2 large radius section
- 1.3 plate setting
- 1.4 burner template

2.

Mark out templates for **six** of the following:

- 2.1 radiused and mitred corners
- 2.2 ball corner or spherical section
- 2.3 concentric cones
- 2.4 fish plates
- 2.5 offset cones
- 2.6 bed plates
- 2.7 truncated cones
- 2.8 gusset plates
- 2.9 square/rectangular to round
- 2.10 structural components
- 2.11 fishtail
- 2.12 simple seating (tank cradles)
- 2.13 segmented bends (lobsterback)
- 2.14 box edges
- 2.15 other specific shapes

3.

Use **all** of the following tools and instruments to mark out directly from drawings onto sheetmetal:

- 3.1 scriber
- 3.2 square
- 3.3 centre punch
- 3.4 protractor
- 3.5 rule or tape
- 3.6 dividers or trammels
- 3.7 straight edge
- 3.8 chalk, bluing or paint
- 3.9 laser (where applicable)

4.

Mark out material to include **all** of the following features:

- 4.1 datums and centre-lines
- 4.2 cutting detail and allowances
- 4.3 square and rectangular profiles
- 4.4 bend/fold allowances

4.5 angles
4.6 hole centres and outlining (linear)
4.7 circles and curved profiles
4.8 hole centres and outlining (on pitch circles)

5.

Develop templates that meet **all** the following quality and accuracy standards:

5.1 template profile complies with drawing or job requirements
5.2 dimensional accuracy meets drawing/specification tolerances
5.3 suitably marked or labelled to identify purpose
5.4 marking out uses recognised conventions

Behaviours

Additional Information

You will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as:

- strong work ethic
- positive attitude
- team player
- dependability
- responsibility
- honesty
- integrity
- motivation
- commitment

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